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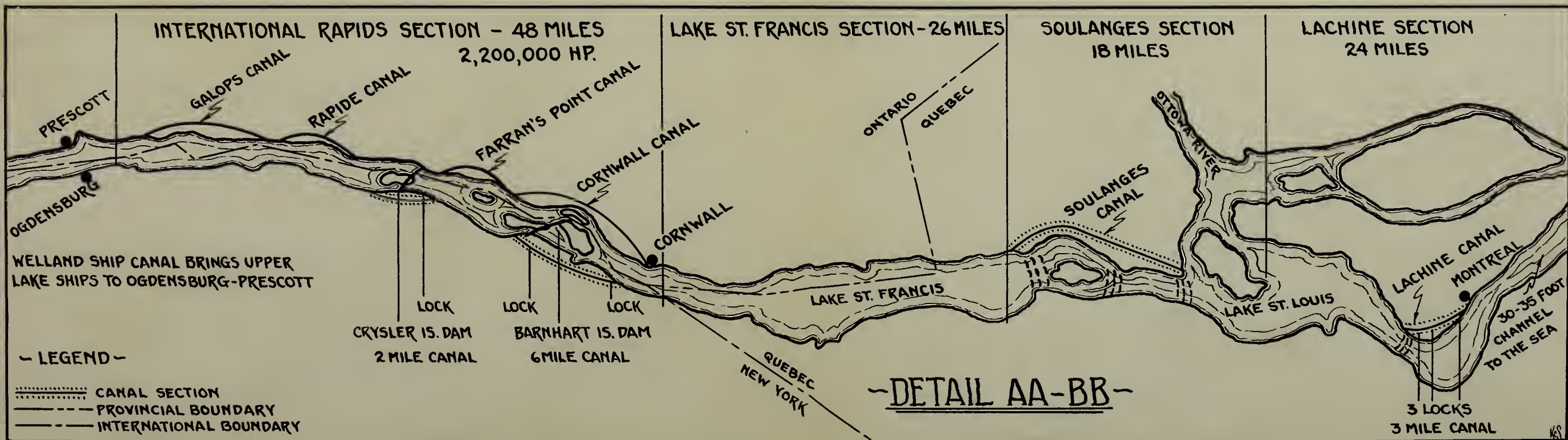
ECONOMIC ASPECTS OF THE ST. LAWRENCE PROJECT

as They Affect the United States

Submitted as a partial
requirement for the degree of
Master of Business Administration

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A.B., Dartmouth College, 1925
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ECONOMIC ASPECTS OF THE ST. LAWRENCE PROJECT
AS THEY AFFECT THE UNITED STATES

CHAPTER I

THE CHALLENGE OF THE ST. LAWRENCE PROJECT

The United States today, in common with the rest of the world, faces the tremendous problem of finding work for its millions of unemployed. For economic reasons it is desirable that this work should be constructive, self-liquidating, and productive of a fair degree of permanent benefit. The power and navigation development on the St. Lawrence River, subject of a treaty signed on July 18, 1932, by the United States and Canada, is such a project. It is proposed to construct a series of channels between the Great Lakes and in the St. Lawrence River which would permit ocean shipping to penetrate to the mid-continent. The farmer, miner, and industrialist of the Middle West would thus be given economic and commercial advantages now enjoyed only by the seaboard; in effect it would give to the United States and Canada a fourth seacoast. Incidentally, and of almost equal importance, consumers of power, domestic, industrial, and commercial, in regions adjacent to the St. Lawrence would profit by an abundance of relatively cheap hydro-electric energy.

Before we consider the economic aspects of the undertaking, let us look for a moment at the geography of the Great Lakes-

St. Lawrence system. The St. Lawrence River, discovered by Jacques Cartier in 1536, has been called "the river that has no end." It is part of a huge system that includes all the Great Lakes, these latter comprising the largest body of fresh water in the world.¹ The water surface area of the Lakes system is nearly 100,000 square miles, and the shore line measures 8300 miles.² Even today, with traffic limited to lakecraft, the lake commerce is over 100,000 tons yearly. From Duluth at the tip of Lake Superior to the Gulf of St. Lawrence, the system stretches approximately 1700 miles. The river is notable for its even flow; its width varies from one mile at the International Rapids Section near Ogdensburg, N. Y., to almost twenty miles as it broadens into the Gulf.³ From Lake Ontario to the point where it intersects 45° North Latitude, the river serves as the international boundary between the United States and Canada.

For purposes of this project, the focal point of ~~the~~ interest in the entire system is that section of the river between Montreal and Lake Ontario. Eight miles above Montreal are the Lachine Rapids, at the eastern end of Lake St. Louis. Lake St. Louis is sixteen miles long, and, at its widest point, eight miles across. Westerly in the direction of Lake Ontario three series of rapids are encountered: the Cascade Rapids,

1. Encyclopedia Britannica, Volume 19, page 840.
2. "The Great Lakes-St. Lawrence Waterway," Russell C. Lohnes, thesis, 1932, pages 296, 297.
3. "Story of the Seaway." Great Lakes-St. Lawrence Tidewater Association. Chart, 1932.

Cedar Rapids, and Coteau Rapids. The river then widens into Lake St. Francis, which is thirty miles in length, but only five miles in width at its widest section. The International Boundary intersects the river at the western end of Lake St. Francis, and here also are the Long Sault Rapids with a river drop of forty-eight feet. From this point to Lake Ontario the river narrows perceptibly, and more rapids are found at Farran's Point, Rapide Plat, Point aux Iroquois, Point Cardinal, and the Galops.¹

At present in this section of the river between Montreal and Lake Ontario there are six canals, sufficient in depth for only river and lake vessels of small draft.

The Lachine Canal is $8\frac{1}{2}$ miles long, and cuts the southeastern part of Montreal Island. It has five locks, is 14 feet deep, and is 130 feet wide.

The Soulange Canal carries traffic from Lake St. Louis to Lake St. Francis, and is 14 miles in length. It is north of the river and has five locks and a depth of 15 feet.

At the western end of Lake St. Francis is the Cornwall Canal, running north of Barnhart Island and the river for eleven miles. It overcomes the Long Sault Rapids and has a depth of 14 feet, with six locks.

Next, to the west, is the Williamsburg group of three canals--Farran's Point, Rapide, and Galops. In the group there are $12\frac{1}{2}$ miles of canal for a total distance of over 26 miles of river. The existing canal system provides only

1. "The Great Lakes-St. Lawrence Waterway," Russell C. Lohnes, thesis, 1932, page 57.

for an all-distance depth of 14 feet, while the treaty recommends a depth of 27 feet.

Southwest of Lake Ontario and connecting this lake with Lake Erie is the new Welland Canal, recently completed by Canada. It is a marvelous engineering work, 200 feet wide, 27 feet deep, 25 miles in length, and having seven locks.

Access is gained from Lake Erie to Lake Huron by the Detroit and St. Clair Rivers, which, if the pending treaty is ratified, the United States will deepen to 27 feet.

Between Lake Huron and Lake Superior is St. Mary's River which is 63 miles long. Here it is planned to increase the depth of the two existing canals from 24.6 feet to 27 feet, and to construct five locks, one of which will be Canadian.

The entire Great Lakes-St. Lawrence system would reach from Cleveland to San Francisco. On the United States side are such ports as Chicago, Detroit, Buffalo, Erie, Toledo, and Milwaukee, indicating the vast economic importance of the system from the point of view of navigation.

The river itself carries about 220,000 cubic feet of water a second into the Atlantic Ocean,¹ and its fall from Lake Ontario to the sea is slightly over 246 feet. In the 48 miles from Ogdensburg to Cornwall there is a river drop of 85 feet.² The series of rapids in the river between Lake Ontario and Montreal

1. First Report, New York Power Authority, 1931, page 9.

2. Ibid, page 9.

afford the possibility for development of ~~half~~^{five} million horsepower of electrical energy. In the 48 miles of river from Ogdensburg to Cornwall it is estimated that at least 2,200,000 horsepower can be developed, and one-half of this amount would belong to each of the two great nations that¹ signed the treaty.

Part of the work on this navigation and power project has already been finished by the United States and Canada. The completed seaway will consist of a 27-foot channel through the Great Lakes to Montreal, from which point there exists a 30-foot channel to the Atlantic.

Former President Hoover stated that "Such a depth [27 feet] will admit practically 90% of the ocean shipping of the world to our lake cities." Mr. Hoover further said: "The waterway will probably require ten years for completion during which the normal growth of traffic in the nation will far more than compensate for any diversions from American railways and other American port facilities."²

In the area affected by the seaway live over forty million people engaged in agriculture, mining, and manufacture of products, and having an exportable surplus of economic goods. The seaway will tend to put this area on an economic parity with the Eastern part of the country, as long and costly rail hauls will be obviated, and transportation costs will be

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1. First Report, New York Power Authority, 1931, page 9
 2. Seaway News, July 23, 1931, Great Lakes-St. Lawrence Tidewater Association.

reduced. In times like the present, low transportation costs are a matter of vital import to the farmer, miner, and manufacturer.

Structurally, this "road to the sea" will necessitate the building of dams in the International Rapids Section of the river. Under the pending treaty, two dams would drown out the rapids. The upper dam would be at Crysler Island, on the Canadian side of the river, and the lower dam would be located¹ at Barnhart Island on the United States side of the river. At Crysler Island there would be one lock with two miles of canal, and at Barnhart Island there would two locks with six miles of canal.

At each of the two proposed dams, contemplated under the treaty, two power houses would be constructed, one on each side of the river. These power houses would facilitate the equal distribution of power between the two nations. On the North American power map, the hydro-electric possibilities of the river are estimated to be second only to² ^{those of} the Columbia River.

The two nations that would participate in this huge project and which border on this system have similarity in language, heredity, and democratic government, all of which should facilitate the completion of the plan, making it a landmark in international economic cooperation.

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1. "The Seaway and the Treaty", page 5, C. J. McManus, published by the Great Lakes-St. Lawrence Tidewater Assn.
 2. New York Times, page XX3, by R. L. Duffus, Oct. 2, 1932.

CHAPTER IISOME CONSIDERATIONS OF STEAM POWER AND OF WATER POWER

So important and so technical is the power phase of the project we are considering, that we shall first distinguish and discuss steam power and water power. The resultant electrical energy is the same regardless of the source of the power. Power is one of the fundamental factors on which daily life in this mechanized and technological age is built, ~~and~~^{yet} so accustomed have we become to modern equipment and machinery that we lose sight of the moving force behind the scenes.

Of the total power generated in the United States today one-third is hydro-electric or water power.¹ The industrial section of our nation lying east of the Mississippi relies largely on steam power. Steam plants can be located anywhere, but usually they are found near the load center or near an adequate supply of condensing water or cheap fuel. The fuels used are coal, oil, and gas. The most efficient steam stations² generate a kilowatt hour from one pound of coal.

The efficiency of steam plants has so increased in recent years that their total cost is often found to be lower than the total cost of many hydro-electric developments. This, however, is not applicable to the proposed St. Lawrence project, where the dams to be built in the St. Lawrence River in order to facilitate navigation will also be integral parts of the hydro-electric development. This factor results in relatively low cost of power production.

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1. New York Times, pageXX3, article by M. W. Cassmore , 12-18-32.
 2. Electric Light and Power Industry in the United States, page43, published by The National Electric Light Ass'n, 1931.

Even the most efficient and modern steam plant utilizes only about 25% of the heat units available in the fuel, while the modern hydro-electric plant makes about 90% of the energy¹ in falling water into electrical energy.

The United States today leads the world in its total available water power and in capacity of water power already developed.² Because of the variable nature of the flow of rivers, more power can be produced at certain seasons than can be produced continually. During low water seasons hydro-electric plants produce approximately 75% as much energy as in high water months.

Water power is one of the greatest natural resources of any nation, and in the creation of energy from falling water no raw material is consumed or destroyed. The seasonal volume of the water in any development can be estimated and the power output at various seasons can be definitely predicted.

A river development for power purposes does not offer the danger of labor troubles that a steam plant does, and the interest on the completed water power investment does not vary greatly. In the case of the steam plant, the operating expenses and fuel costs fluctuate yearly; and while the raw materials used in the production of steam power are exhaustible, a river, on the other hand, is inexhaustible. As stated above, the modern steam plant usually has an advantage in relative cost. A water power plant with transmission system may cost more than \$200 per horsepower

1. Electric Light and Power Industry in the United States, page 47, published by The National Electric Light Ass'n, 1931.
2. Ibid., page 45.

of capacity, while an efficient steam turbine plant may not cost more than \$100 per horsepower.¹ But this comparison of relative costs does not apply in the instance of the St. Lawrence in the light of the estimates of the New York State Power Development Commission embodied in their report of 1931. This report states that the probable cost of the initial increment of 600,000 firm horsepower in the International Rapids Section of the St. Lawrence River would be under \$12 per firm horsepower per year, but that under the most favorable conditions, power could not be generated by steam in the same vicinity for less than \$25 per firm horsepower per year.² Even in the instance of the average hydro-electric plant, if the annual operating expense is low, the usual advantage in the matter of costs in favor of the steam plant may be overcome. It also must be remembered that because of the constant progress in methods of steam generation, the life of the steam plant may be shorter, and consequently larger reserves must be set up on the books.

In summary, it may be said that total costs are generally lower in the case of steam plants. However, if the hydro-electric plant is constructed at a great fall or drop in water level, the lower initial total costs usually favoring steam plants may be overcome, and the long-run advantage may lie with the water power plant. It must be emphasized that the projected St. Lawrence plant, due to the apportioning of dam costs and to the great river drop, can produce much cheaper power than could be produced by steam in the same vicinity.

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1. The Electric Light and Power Industry in the United States, page 47, 1931.
 2. Report of St. Lawrence Power Development Commission, 1931, page 24.

CHAPTER IIITHE TREATY NEGOTIATED BETWEEN THE UNITED STATES AND CANADA

Reference has been made to the treaty signed July 18, 1932, and we must give further attention to it before proceeding to a more detailed consideration of our subject. Few realize the involved negotiations and many studies made with reference to the St. Lawrence prior to 1932 which finally consummated in the signing of the treaty by Henry L. Stimson, Secretary of State for the United States, and William D. Herridge, Canadian Minister to the United States.

From 1710 to 1929 there were fourteen important treaties signed by Canada and the United States which affected territories, waterways, and boundaries. The problem of deepening the St. Lawrence for navigation purposes was first discussed in a pamphlet in 1832, just one hundred years before the treaty was signed, by a writer who published his work under the name of "A Projector." However, it was not until 1920 that the two governments "referred the matter of the improvement of the St. Lawrence River for ocean navigation, with the development of power incidental thereto, to the International Joint Commission, under the terms of Article 9 of the treaty of January 11, 1909. The two governments requested that the International Joint Commission investigate the project and submit a report to them on its feasibility and practicability. The report of the Joint Board of Engineers, dated December 19, 1921, recommended that the Governments of the United States and Canada enter into an arrangement by way of a treaty for a scheme of improvement of the St. Lawrence River between Montreal and

Lake Ontario; the Commission further recommended "that the New Welland Ship Canal be embodied in said scheme and treated as a part thereof." The technical phases of the report of the International Joint Commission were based on an engineering report, dated June 24, 1921, which was prepared by Colonel W. P. Wooten, United States Army Engineers, and Mr. W. A. Bowden, then Chief Engineer of the Canadian Department of Railways and Canals. In its report the International Joint Commission suggested that the project, before any final decision be reached, be referred to an enlarged engineering board for further study."¹

On March 14, 1924, President Coolidge appointed a commission of nine men, headed by the then Secretary of Commerce, Herbert C. Hoover, to act as an advisory group on all questions that might arise concerning the proposed project. The Canadian Government appointed a similar group on May 4, 1924.

In April of 1924, following the suggestion of the International Joint Commission, a Joint Board of Engineers, consisting of three appointees of each Government, were selected. The American members, appointed on April 2, 1924, were:

The late Major General Edwin Jadwin, (then Colonel,
United States Army Engineers).

Colonel William Kelly, Corps of Engineers.

Brigadier General George B. Pillsbury (then Lieutenant Colonel, Corps of Engineers).

1. Statement to the press, Department of State, July 18, 1932, page 1.

The Canadian representatives on the Joint Board of Engineers, appointed May 7, 1924, were:

Mr. Duncan W. McLachlan of the Department of Railways and Canals, Ottawa.

Mr. Olivier O. Lefebvre, Chief Engineer, Quebec Streams Commission of Montreal.

Brigadier General Charles Hamilton Mitchell, C.B., C.M.G., of Toronto.

"The Joint Board of Engineers submitted its report on November 16, 1926. Their report contained detailed plans for the construction of the proposed waterway and for the development of the waterpower in connection therewith. There was, however, a difference of opinion in regard to some of the technical details of the project, the American engineers favoring a single-stage development, while the Canadian engineers recommended a double-stage development."¹ On December 27, 1926, the commission headed by Herbert C. Hoover reported. The engineers found that the entire project was feasible from the engineering point of view, and Mr. Hoover's commission found that the seaway was imperative for the relief and future development of the continent.² The Joint Board of Engineers reconvened in December, 1931, and again recommended the undertaking of the project on April 9, 1932, and, after diplomatic negotiations, the treaty was finally signed.

The preamble of the treaty starts with a recognition of facts as follows: "The construction of a deep waterway, not less than twenty-seven feet in depth, for navigation from the interior of

1. Statement to the press, Department of State, July 18, 1932, page 1.
 2. Ibid, page 2.

the Continent of North America through the Great Lakes and the St. Lawrence River to the sea, with the development of the waterpower incidental thereto, would result in marked and enduring benefits to the agricultural, manufacturing, and commercial interests of both countries, and

Considering further that the project has been studied and found feasible by the International Joint Commission, the Joint Board of Engineers, and by national advisory boards, and Recognizing the desirability of effecting a permanent settlement of the questions raised by the diversions of waters from or into the Great Lakes System, and

Considering that important sections of the waterway have already been constructed, and

Taking note of the declaration of the Government of Canada of its intention to provide, not later than the date of the completion of the deep waterway in the international section of the St. Lawrence River, for the completion of the New Welland Ship Canal, and of canals in the Soulanges and Lachine areas of the Canadian section of the St. Lawrence River which will provide essential links in the deep waterway to the sea, and,

Taking note of the declaration of the Government of the United States of its intention to provide, not later than the date of the completion of the deep waterway in the international section of the St. Lawrence River, for the completion of the works in the Great Lakes System above Lake Erie which will provide essential links in the deep waterway to the sea,

The President of the United States of America and His Majesty the King of Great Britain, Ireland and the British dominions beyond the Seas, Emperor of India, in respect of the Dominion of Canada Have decided to conclude a Treaty for the purpose of ensuring the completion of the St. Lawrence Waterway project."¹

Under the treaty Canada agrees to construct, operate, and maintain the necessary works in the Thousand Islands section below Oak Point; to construct, operate, and maintain a side canal, with locks opposite Crysler Island; and to do the necessary works to rehabilitate the Canadian side of the International Boundary.

The United States, on its part, intends to construct, operate, and maintain a side canal and locks opposite Barnhart Island; to construct, operate, and maintain necessary works in the Thousand Islands section above Oak Point, and to rehabilitate the American side of the International Boundary.

In the third article of the treaty a St. Lawrence International Sections Commission is proposed, having five representatives of each nation to supervise the construction of the works in the International Rapids Section exclusive of power works and not provided for in the above two paragraphs. The United States is to provide the necessary funds for the construction of the works in the International Rapids Section authorized by this Commission.

1. Text of the treaty, press release, State Department, July 18, 1932, page 1.

The treaty provides that there shall be equal distribution between the two countries of water used for power purposes, stating that the quantity of water utilized during any daily period for the production of power on either side of the International Boundary in the International Rapids Section shall not exceed one-half of the flow of water available for that purpose during such period.¹ It is recognized that the utilization of the water power is a domestic concern of the participating nations.

Each nation at any time in the future may construct alternative canals and channels in the international Section, and in the waters connecting the Great Lakes. Recognition is made of the common interest of the signatories in the preservation of the levels of the Great Lakes System. The treaty provides:

"(a) 1. that the diversion of water from the Great Lakes System, through the Chicago Drainage Canal, shall be reduced by December 31st, 1938, to the quantity permitted as of that date by the decree of the Supreme Court of the United States of April 21st, 1930;

"2. in the event of the Government of the United States proposing, in order to meet an emergency, an increase in the permitted diversion of water and in the event that the Government of Canada takes exception to the proposed increase, the matter shall be submitted, for final decision, to an arbitral tribunal which shall be empowered to authorize, for such time

1. Text of the treaty, press release, State Department, July 18, 1932, page 3.

and to such extent as is necessary to meet such emergency, an increase in the diversion of water beyond the limits set forth in the preceding subparagraph and to stipulate such compensatory provisions as it may deem just and equitable; the arbitral tribunal shall consist of three members, one to be appointed by each of the Governments, and the third, who will be the Chairman, to be selected by the Governments;

"(b) that no diversion of water, other than the diversion referred to in paragraph (a) of this Article, from the Great Lakes System or from the International Section to another watershed shall hereafter be made except by authorization of the International Joint Commission;

"(c) that each Government in its own territory shall measure the quantities of water which may at any point be diverted from or added to the Great Lakes System, and shall place the said measurements on record with the other Government semi-annually;

"(d) that, in the event of diversions being made into the Great Lakes System from watersheds lying wholly within the borders of either country, the exclusive rights to the use of waters equivalent in quantity to any waters so diverted shall be vested in the country diverting such waters, and the quantity of water so diverted shall be ^{at} all times available to that country for use for power below the point of diversion, so long as it constitutes a part of boundary waters;

"(e) that compensation works in the Niagara and St. Clair Rivers, designed to restore and maintain the lake levels to

their natural range, shall be undertaken at the cost of the United States as regards compensation for the diversion through the Chicago Drainage Canal, and at the cost of Canada as regards the diversion for power purposes, other than power used in the operation of the Welland Canals; the compensation works shall be subject to adjustment and alteration from time to time as may be necessary, and as may be mutually agreed upon by the Governments, to meet any changes effected in accordance with the provisions of this Article in the water supply of the Great Lakes System above the said works, and the cost of such adjustment and alteration shall be borne by the Party effecting such change in water supply."¹

These are some of the main features of the treaty, which has as its object the elimination of the transportation disadvantages of a large section of two great nations, and which offers the added value of tremendous quantities of relatively cheap water power.

1. Text of the treaty, press release, State Department, July 18, 1932, page 4.

CHAPTER IV

ENGINEERING AND COST PHASES AND THE TWO PLANS

In the preceding pages, statements have been made which bear upon the engineering phases and the costs of the project to each country involved for the entire navigation and power developments. It is now necessary, inasmuch as many engineers have found the planned development to be eminently practical, to consider what these scientific investigators have done and said.

The International Joint Commission, in its report in 1921, recommended that there be an engineering investigation of the feasibility of the project, and in 1924 President Coolidge, as previously stated, appointed a Joint Board of Engineers consisting of three members from this country who joined with three Canadian members to study the project. This Board reported to its respective Governments on November 16, 1926. In 1930 further study was deemed desirable, and, on January 23, 1930, the Joint Board was revived and a subsequent report was made on April 9, 1932.¹

The project agreed upon in the final report was the so-called two-stage plan which has been mentioned in

1. Department of State, press release, Report of the Joint Board of Engineers, pages 1 and 2.

Chapter III under a discussion of the treaty and what the nations agree to do thereunder. This two-stage plan, and single-stage plan, which will be explained later, relate to developments projected for power and navigation in the International Rapids Section of the System.

Under the treaty plan there are to be two dams, one at Crysler Island and the other at Barnhart Island, with two¹ power houses at each dam. Side canals will be constructed at each island to carry shipping past the dams and power houses, with one lock at Crysler Island and two locks at Barnhart Island. Provision is also made for a free open channel south of Galop Island to facilitate navigation, and for a diversion channel through this island "capable of discharge control in the interest of both navigation and power." The size of the channel between Lotus Island and Ogden Island is designed to provide at least 95,000 square feet of river section at ordinary operating levels. Works will be constructed to protect the interests of the towns and villages which the project will affect, a lock will be built at Crysler Island for passing 14-foot navigation through the dam, and at Barnhart Island a similar dam will give access² to the Cornwall Canal. Under this plan the dam and power houses at Crysler Island will be erected on a solid rock sill, and the Canadian and United States power houses can³ be within the territory of each country.

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1. Department of State, press release, report of the Joint Board of Engineers, page 3.
 2. Ibid, page 4.
 3. Ibid, page 4.

The two-stage plan was described in the 1926 report of the Joint Board of Engineers, and was favored by Canada's engineers, while the United States' section of the Board at that time favored the so-called single-stage development.¹

The reason for the Canadian preference for the two-stage plan has been set forth by Mr. Oliver Lefebvre, member of the Canadian section of the International Joint Commission, who insisted that the "uniform flow of the St. Lawrence must be maintained at all costs," and stressed the fact that a large power plant will regulate the flow in terms of its "load curve." He goes on to state:

"We insist that the control of the flow from Lake Ontario be not connected with a power plant having a capacity of several million horsepower. The ideal plan would be the construction of a control dam for the flow only. But as this plan would involve the loss of a certain quantity of power which may become very valuable, and which has an important value today, we agreed to connect this dam with a hydro-electric plant of much less proportions, and which can be operated as a basic plant with a uniform load twenty-four hours a day For this reason we favor concentration at two points--the two-stage development. The control dam would be at Crysler Island, a few miles below the town of Morrisburg."

Mr. Lefebvre insists that the two-stage plan will mean uniformity of discharge of water from Lake Ontario, which is

1. Department of State, press release, report of the Joint Board of Engineers, page 3.

in the interest of both good navigation and safeguarding¹ the water power on the Canadian section of the river. The United States engineers were convinced of the superiority of the Canadian view before the later report was made in April, 1932, and this is the plan embodied in the treaty.

The single-stage plan, which was at first favored by the United States engineers and which was recommended by the Engineering Advisory Board of the St. Lawrence Power Development Commission of the State of New York, called for a single plant² at Massena Point in New York. The power plant to be located at this point was to have had a head of 85 feet of water, and its cost was estimated at less than the two-stage plan. The total cost of the single-stage plan, for both power and navigation³ development, was to have been about \$221,000,000.

The two-stage, or treaty, plan is estimated to cost \$274,742,000 (1926 price base). The head of water available will average 58 feet at Barnhart Island, and 22 feet at Chrysler Island. The installed horsepower available at Barnhart Island is estimated at 1,607,000, and at Chrysler Island at⁴ 592,960.

It should be remembered in comparing these costs that on the 1926 price base the entire project envisaged by the treaty covering the territory from Duluth to Montreal is estimated to cost \$543,000,000.

Prior to the treaty, the entire Joint Board, in its report, said: "The Joint Board is of the unanimous opinion

1. First Annual Report of the Power Authority of the State of New York, 1931. Pages 23 and 24.
2. Ibid, page 23.
3. Report of the St. Lawrence Power Development Commission of New York, 1931, page 43.
4. Department of State, press release, Report of the Joint Board of Engineers (Reconvened), page 5.

that the two-stage plan above defined is practicable and feasible from an engineering point of view; that there is no question as to the safety of the works proposed; and that the navigation requirements and power recovery are provided for adequately.¹"

The share of the United State of the above total cost is but \$215,492,000.² It must also be remembered that this latter figure includes the sum of \$89,000,000 which is estimated to be the share of New York State in the entire project.³ An excellent summary of estimated cost of the two-stage plan appears in the Report of the Joint Board of Engineers under date of April 9, 1932. The summary is set forth as follows:

	\$	\$
A - WORKS SOLELY FOR NAVIGATION--		
I. Upper Pool--Opposite Crysler Island	8,219,000	
II. Lower Pool--Opposite Barnhart Island	25,969,000	34,188,000
B - WORKS PRIMARILY FOR POWER--		
I. Upper Pool--Crysler Island-		
(a) Substructures, Head and Tailrace Excavation . . .	24,893,000	
(b) Machinery and Superstructures	30,612,000	
II. Lower Pool--Barnhart Island-		
(a) Substructures, Head and Tailrace Excavation . .	33,698,000	
(b) Machinery and Superstructures	<u>43,249,000</u>	
		132,452,000

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1. Department of State, press release, Report of the Joint Board of Engineers (Reconvened), page 5.
 2. Note by Charles Craig, executive director, Great Lakes-St. Lawrence Tidewater Association, accompanying Report of the Joint Engineering Board.
 3. New York Times, 2/11/33, Report of the subcommittee of the Foreign Relations Committee of the United States Senate.

C - WORKS COMMON TO NAVIGATION AND POWER--

\$

\$

I. Upper Pool--

(a) Channel Excavation	41,463,000
(b) Chrysler Isd. Dam, 140 ft. lock and dykes	14,458,000
(c) Highway Relocations	1,289,000
(d) Railroad Relocations	987,000
(e) Acquisition of Lands - Canadian Side	2,917,000
(f) Acquisition of Lands - U. S. Side	2,316,000
(g) Rehabilitation Works - Iroquois and Morrisburg	8,403,000
(h) Miscellaneous	<u>4,003,000</u>

75,836,000

II. Lower Pool--

(a) Channel Excavation	6,874,000
(b) Main Long Sault Dam and Dykes	17,231,000
(c) Highway Relocations	421,000
(d) Railroad Relocations	112,000
(e) Acquisition of Lands - U. S. Side	818,000
(f) Acquisition of Lands - Canadian Side	2,781,000
(g) 14-ft. Navigation	2,412,000
(h) Supply channel and weir at Massena, ...	1,318,000
(j) Miscellaneous	<u>299,000</u>

32,266,000

\$274,742,000

It may be concluded that, on the basis of 1926 prices, the net cost to the Federal Government would be in the vicinity of \$126,000,000. If the present price level prevails when contracts for the work are let, the actual cost of the project will, without doubt, be much less.

CHAPTER V
LEGAL ASPECTS

Multitudinous legal problems are bound to arise in connection with so vast a project as that contemplated on the St. Lawrence River. The treaty and fairness dictate that each of the two participating nations shall be entitled to half the power, and upon consideration of the fact that each nation will spend one-half the total cost of the project for both navigation and power, this seems an equitable distribution.

The Federal Government of the United States is one of delegated powers, and the sovereignty of the nation rests in the several states and the people thereof. We start, then, with the premise that under the law the development of St. Lawrence power in the waters adjacent to New York is a "public purpose," and, since this is the case, that the State of New York can engage in the business of generating power.¹ In the case of *Milheim vs. Moffatt Tunnel District* (262 U.S. 710), the Court said: "The test of the public character of an improvement is the use to which it is to be put, not the person by whom it is to be operated." The State of New York is the owner of the United States' half of the bed of the St. Lawrence River, and the flow of the river can be used by the State for any "public purpose."

1. *Long Sault Development Co. vs. Kennedy*, 158 Appellate Division, N.Y. 411.

The State of New York, having the rights mentioned above, may of course create a corporation or subsidiary to carry out its powers as a State in the matter.¹ Such a corporation duly created by the State is exempt from all taxation by the Government of the United States.² Inasmuch as only half the power to be developed belongs to the United States, a working agreement must be made with the Province of Ontario and the Dominion of Canada, and this may be done with the assent of the United States Congress.³

The riparian owner, living along the river banks of the St. Lawrence, has unqualified right and title to the upland bordering the river, the right of access to the river, and the right to whatever water is necessary for domestic use and irrigation of his property, subject to the paramount right of the sovereign State to all navigable waters and rights to the use of power to be developed therefrom.⁴ We must also bear in mind that while the riparian owner has title to the upland, the State alone has title to and absolute ownership of the one-half of the river-bed on the United States side of the St. Lawrence River,⁵ and the State may control and limit the rights of the riparian owner for the benefit of all the people. Also when the State or Federal

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1. Fallbrook Irrigation District vs. Bradley, 164 U.S. 112, 174.
 2. McCulloch vs. Maryland, 4 Wheaton (U.S.) 316.
 3. Constitution of United States, Art. 1, Sec. 10; Virginia vs. Tennessee, 148 U.S. 503, 519.
 4. Brookhaven vs. Smith, 188 N.Y. 74.
 5. Little Falls Fibre Co. vs. Ford & Son, 249 N.Y. 495.

Government, to construct, improve, or promote navigation, takes or destroys private riparian rights in a river it may do so without compensation to the riparian owner along the river banks,¹ except that when the upland of the riparian owner is flooded by a proposed river improvement he must be compensated for the property so taken.² If the sovereign state takes riparian rights from private individuals for the promotion of navigation, and also as a result there is surplus saleable power in the hands of the state, this fact will in no way interfere with the principles enunciated above with reference to the compensation of riparian owners along the river banks.³

Since it will be granted without contest that the State of New York has the ownership of the southerly half of the bed of the St. Lawrence River, it follows that it also possesses the ensuing property right to the flow of the river, and hence the rights to utilize the same for power purposes.⁴ While the right to utilize for power purposes rests in the State, the states delegated to the Federal Government control over interstate and foreign commerce; and though the Federal Government has primary control in the latter matter, the delegation was not absolute, and the state may still exercise its

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1. Slingerland vs. International Contracting Co., 169 N.Y. 60.
 2. Scriber vs. Smith, 100 N.Y. 471, 478.
 3. Fulton vs. State, 65 Misc. N.Y. 263; U.S. vs. Chandler Dunbar Co. 229 U.S. 53.
 4. Federal Regulation of Water Power in N.Y. State, 1913 Vol., 2 A.G. 205, 218.

sovereign right over commerce and navigation where it is not inconsistent with an act of Congress regulating interstate and foreign commerce.¹

The Federal Government has also been delegated the treaty-making power by the several states, but this power cannot be used to violate or interfere with the federal system or the powers reserved to the states.² Inasmuch as Congress has passed the Federal Water Power Act, it would seem a practical move to have representatives of New York State and the United States reach a definite agreement with reference to the generation of the great potential horsepower of the St. Lawrence.

As the cost of the Seaway will be to this country between \$215,000,000 and \$275,000,000, and in fairness and equity, because of the benefits that will accrue to the people of the State of New York, the latter State, through its Power Authority or similar agency, must bear a proper share of the cost of the works which will be erected and projected for the development of hydro-electric energy, and for navigation works that contribute to the proposed power development. In the latter group, or works for both navigation and power, come such items as the cost of dams, dykes, and contemplated works for river enlargement. Of Canada's expenditures on the project the Hydro-Electric Commission of the Province of Ontario has agreed to accept slightly over \$104,000,000 as

1. Minnesota Rate Cases, 230 U.S. 352, 402.

2. Missouri vs. Holland, 252 U.S. 416.

its just share of the cost to the Dominion.¹

It should be said here that over a year prior to the signing of the treaty the Power Authority of New York State and Governor Roosevelt wrote President Hoover asking that, inasmuch as the State of New York had a primary interest in the proposed power development which the treaty envisaged, they be allowed to confer with the Federal authorities relative to costs of the project, and to cooperate with the Federal Government in the treaty negotiations.² When Herbert Hoover was Secretary of Commerce under President Coolidge, and was chairman of the United States-St. Lawrence Commission, he stated in the Commission's report, dated December 27, 1926, that New York State, because of the potential power in the St. Lawrence, had a peculiar interest in the entire project.³ It was therefore to be expected that New York would be allowed representation in and during the pre-treaty negotiations of 1931 and 1932; but the State Department and the Executive Department did not offer full or even adequate cooperation in response to the letters from the Governor of New York and the Power Authority, with the result that, after the treaty had been signed, the State and the Federal Governments were approximately \$20,000,000 apart on the estimated amount of the entire burden of proposed ex-

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1. Letter of Director Craig, page 1, Great Lakes-St. Lawrence Tidewater Association, Oct. 1, 1932.
 2. Copies of letters, pages 67-69, First Annual Report of the New York Power Authority, 1932.
 3. Senate Document 183, Second session of 69th Congress, by Chairman Hoover, page 7, #14.

penditure which should be borne by the State of New York.¹ Assistant Secretary of State Rogers believed that New York's share of the total estimated cost, \$274,742,000, should be between \$93,000,000 and \$122,000,000. On the other hand, the Power Authority, after a thorough investigation, felt that New York should pay \$74,000,000 in annual instalments of \$4,000,000 toward the cost of the work.² It is unfortunate that there existed this divergence in estimates, due to the failure of the Federal Government to permit New York to confer with it regarding cost before the treaty was signed.

On February 10, 1933, the sub-committee of the Senate Foreign Relations Committee let it be known that they deemed \$89,000,000 the fair amount that should be borne by New York State.³

In Canada, the Dominion Government realized that the Province of Quebec, and particularly the Province of Ontario, had direct vital interest in negotiations and costs, and closer harmony existed there, with the result that the accord on costs was more quickly reached by Canadian authorities.

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1. Springfield Republican, December 15, 1932.
 2. Ibid, December 15, 1932.
 3. New York Times, February 11, 1933.

CHAPTER VI
POWER AND NAVIGATION

In discussing the economic significance of so vast an undertaking as the St. Lawrence project, it is necessary first to consider separately the two great benefits which it is designed to facilitate: the production of power and the improvement of navigation.

First, let us look at the economic results of the proposed power development. According to a report issued by the Department of the Interior, only 1/7 of the potential water power of the nation has been developed within the past few years, and of the actual developed horsepower only 13% was manufactured in the State of New York. Inasmuch as water is an important potential source of power, the needs of an expanding industrial civilization impose a duty to utilize this energy.

In the case of the St. Lawrence River, the flow of the river is reduced at certain seasons of the year, and the producible horsepower therefore will vary with the seasons. The State of New York is planning on facing the problem of distributing 4,800,000,000 kilowatt-hours of energy annually, which will be available if New York's share of the power, 720,000 firm horsepower, can be used constantly. At certain periods of the year a market must also be found for 1,500,000,000 kilowatt-hours additional when the flow of the river is normal.¹

1. First Report of the New York Power Authority, 1931, page 25.

This supply of power represents more than 50% of all the current used in the entire United States in 1930.¹

It has been pointed out that we have reason to expect that the St. Lawrence will produce relatively cheap power, even considering the cost of construction. This expectation is strengthened by the New York Power Authority's Second Annual Report, published in March, 1933, which states:

"The Trustees feel that the availability of a huge block of exceptionally cheap hydro-electric power will furnish the increased current required at such a low cost as to assist the electrical industry to shift to the low promotional rates which will ultimately make possible the complete development of the domestic field. This accommodation, requiring a minimum of capital outlay on the part of the industry, will serve to bridge over the transition period which forward-looking utility executives see as the chief obstacle to the sharp rate reductions necessary actually to bring about that extensive domestic utilization of electrical equipment upon which the future well-being of the industry seems to depend.

"The Power Authority's studies of the cost of St. Lawrence power, under the various proposals for its development, reveal the extent of this possibility.

"The recent joint recommendations of the representatives of the Power Authority and the United States Engineers as to New York's share of the cost of the development in the International Section of the St. Lawrence River, make it possible

for the first time to set a reasonably definite maximum figure for the cost of generating New York's share of the power.

"These recommendations would establish somewhat less than \$90,000,000 as the capital cost of New York's power project. If financed by the Power Authority with 5 per cent. bonds and provision for amortization over a period of forty years, the annual costs, including renewal, maintenance and operation would be approximately \$6,800,000. This amount includes nearly \$900,000 a year for amortization which will wipe out the whole debt at the end of forty years, thereby also eliminating at that time more than \$4,000,000 in annual interest charges. Thereafter the annual expense will include only the cost of renewals, maintenance and operation totaling not more than \$1,500,000, reducing the per horsepower year cost of generating the power to an almost nominal figure.

"On the assumption that there will be 710,000 firm horsepower available, the annual cost during the first forty years will mean power at considerably less than \$10 per horsepower year, without making any allowance for the undoubted value of a large amount of secondary power available during a portion of the year. If this firm power could be used at 100 per cent. load factor the annual cost would be equivalent to less than 1.5 mills per kilowatt-hour.

"In the event that the capital cost is financed on the basis suggested by the State Department early in the negotiations, in accordance with which the Power Authority would

pay its share to the Federal Government in annual instalments over a period of forty years, with interest at 4 per cent., the annual costs would total around \$6,000,000. This would mean firm power at about \$8.50 per horsepower year, or around 1.3 mills per kilowatt-hour if used at 100 per cent. load factor.

"The general consensus in the discussions with the Federal Government has been that New York would finance and construct its power house superstructures and install its machinery, while the Federal Government would finance and construct the remaining works, with provision that New York pay its share of the cost of such works on the annual payment basis. On this assumption the power will be available at an annual cost of about \$9 per horsepower year, or about 1.4 mills per kilowatt-hour at 100 per cent. load factor.

"No allowance is made in these calculations for the probability that the works will be constructed for materially less than the cost estimates used in the final report of the Joint Board of Engineers, which are based on 1926 unit costs. Contracts for river work, similar to that required in the St. Lawrence project, are now being let by the United States Engineers at from 25 per cent. to 50 per cent. below estimates based on pre-depression conditions.

"If circumstances permit the early undertaking of the project, costs may fall 20 per cent. below the figures used in the report. According to the understanding with the United States Army Engineers, the New York power project would share proportionately in any such savings.

"In order to be conservative, however, the Power Authority is basing its calculations upon the estimated costs as they appear in the final report of the Joint Board of Engineers, on the basis of which it can count on producing power ready for transmission on a 100 per cent. load factor basis, at from 1.3 mills to 1.5 mills per kilowatt-hour. On a 50 per cent. load factor basis, representing a conservative assumption as to the possibilities of marketing, this would mean a generating cost of from 2.6 mills to 3.0 mills per kilowatt-hour.

"For purposes of comparison the Power Authority had a study prepared showing actual generating costs for the utility companies in New York State, including a 7 per cent. return on the capital invested in the generating stations. This study developed the fact that the average cost of water power generation for the entire State was 4.414 mills with an average load factor of 51 per cent. The average cost of steam power generation for the entire State was 10.654 mills with an average load factor of 31 per cent.

"Such comparisons show that 710,000 firm horsepower, generated on the St. Lawrence at from 2.6 to 3.0 mills per kilowatt-hour on a 50 per cent. load factor basis, should greatly facilitate the transition to lower promotional rate schedules in the State."¹

These estimates reduce even the amazingly low figures

1. Second Annual Report of the Power Authority of the State of New York, 1932, page 38, 39.

set forth by the same Power Authority in its First Annual Report.¹

A consideration of the power phase of the project immediately raises two questions: will there be sufficient demand for this vast increase of kilowatt-hours, and, second, who will benefit by this cheap power?

As was stated earlier, the farther this potential energy has to be transmitted the greater will be the total cost, so it is desirable to attract many industries to or near the site if the net cost is to be kept at a minimum. The possibility of cheap power for large industrial users with a demand for off-peak power will induce many new industries to locate near the International Rapids Section of the river, especially when to advantages of cheap power is added a navigation system which will offer to these concerns easy access to the Atlantic ports and Europe.

The members of the St. Lawrence Power Development Commission, who reported to the State of New York in 1931, said: "Industries at the site would undoubtedly take the entire initial increment of 300,000 horsepower, equivalent to about two billion kilowatt-hours, provided necessary industrial plants were to be completed by the time the St. Lawrence project is ready to operate. Any further absorption of power by industries at the site would be through growth over a period of years. There is no doubt but that the entire output could be absorbed eventually in this way by these indus-

1. See page 9.

tries."¹ A more exhaustive consideration of the marketing of St. Lawrence power will be found in a later chapter.

Who will benefit by the low rates that should result from the utilization of St. Lawrence power? It would appear fair that the savings should be passed on in decreased charges to the small consumer, both domestic and commercial. The source from which the power will be produced is the property of state and dominion governments. Its production will be financed by these governments, that is, ultimately, by the taxpaying public. To these taxpayers, therefore, should accrue the benefits. The greatest possible savings in the charges for current should be passed on to the small consumers, who would not be sold their power originally on a commercial basis, and who at the outset have not the bargaining power of the large industrial users. Industrial users will be attracted by low off-peak rates, and will create a steady demand for power when the domestic and small commercial load is at a minimum. Thus industries will gain immediately by the lower rates, which it is hoped will attract them there in the first instance, together with the transportation advantages. These lower rates must be such that they will effectively compete with the lowest rates in other sections of the country, and having given industry this initial advantage it seems only fair that the benefits of decreased costs of production should be passed on to the small consumer.

The suggestion has been made that profits from the sale of power should be turned over to the State treasury for a

1. Report-N. Y. Power Development Commission, 1931, page 28

general reduction of taxes throughout the State, but the rate reduction plan seems to the writer more logical and direct.

Development of the vast water power project also will carry additional advantages, such as the saving of fuel, now used to produce steam power, the probably educative experience of the State with a new system and its rate controls, and, as mentioned previously, the location of new industries in the vicinity of the International Rapids Section of the St. Lawrence.

Coming to the navigation features of the development, we find vast differences in freight rates by rail and water from the Middle West to the Atlantic seaboard. The Middle West is the agricultural region of the country: it furnishes the industrial East with a large part of its dairy products, and raw materials to be used in fabricating and manufacturing. In addition, this great section has increasingly developed as a manufacturing center itself, because of its nearness to the sources of raw materials.

It has been estimated that grain can be transported by the Seaway at one-third to one-half the present cost of rail transportation. Mr. Henry I. Harriman, former president of the Boston Chamber of Commerce, states: When the St. Lawrence Seaway is completed, grain should be carried from Chicago or Duluth to Boston for 6¢ or less per bushel. The all-rail rate on wheat between Chicago and Boston is now

13.5 cents export, and 19.2 cents domestic. Bulk tonnage between the head of the Lakes and Boston now costs from \$4 to \$6 per ton. When the Seaway is completed it should not exceed \$2 per ton, and existing rail rates should be cut 50% for such freight as can move by steamer." What is true of grain freight rates will also be true for the rates on other articles and manufactured products.¹

Prior to the practically unanimous endorsement by experts of the present treaty plan, other possible outlets from the Great Lakes-St. Lawrence System were considered. Because of the possibility of international complications at a future date suggestions were made of possible "all-American" seaway routes. New York State today has a network of barge canals. The Champlain Canal, 63 miles long, runs from Troy to Whitehall on Lake Champlain. The Erie Canal, extending for 341 miles from Troy to Tonawanda on the Niagara River, connects the Lakes with the Hudson River. This canal was promoted as a possible "all-American" route, but its disadvantages as compared with the St. Lawrence project could not be overcome. Power development as a defrayer of cost would have been lacking, and the great cost of deepening the 341 miles of canal and of erecting the necessary engineering works entirely at the expense of this country were decisive factors which caused the plan to be discarded.

CHAPTER VII

OBJECTIONS TO THE PROJECT

The question of ratification of the treaty now awaits action of the United States Senate, as the treaty has been reported favorably by both the Sub-Committee and the Committee on Foreign Relations of that body. The hearing before the Foreign Relations Committee called forth a mighty wordy attack, the aim of which has been to defeat ratification.

The New England opposition to ratification has come from three principal sources:

1. The Port Development Committee of the Providence Chamber of Commerce asks delay on the matter while further research into the facts and into the feasibility is made by the Federal Government. But these matters have already been completely investigated during the twelve years just past. The International Joint Commission in 1921 held forty-four hearings in various cities of the United States on the desirability and feasibility of the navigation project. Their report, made public January 14, 1922, said: "No effort should be spared to secure a plan which, beyond all reasonable doubt, will obtain from the upper St. Lawrence its maximum efficiency in navigation and power." They recommended engineering investigation, and the engineers of both the Federal and New York State governments have recorded themselves as favoring the project.

1. New England and the Seaway Treaty. Bulletin #52 of the Great Lakes-St. Lawrence Tidewater Association, page 8.

When all the investigations made by both the United States and Canada prior to the consummation of the treaty are considered, it seems that the objection of the Providence Committee amounts to mere procrastination, especially when we find that the Joint New England Committee on the St. Lawrence Waterway Project heartily recommended the plans as far back as 1923. This Committee, made up of New England citizens of high standing, stated to their fellow New Englanders: "The Committee therefore places itself definitely on record as favoring the early entrance of this Government into negotiations with the officials of the Canadian Government looking towards the prompt consummation of a treaty which will make possible the undertaking of the enterprise, and urges upon all New England's local and national representatives the desirability of their full cooperation in every reasonable manner to bring this ^a ¹ bout."

2. The Maritime Association of the Boston Chamber of Commerce last fall noted its opposition to the treaty, saying that the success of the undertaking would be at the expense of the railroads, and that the taxpayers would eventually bear the loss the railroads suffer. I have stated previously that Mr. Harriman pointed out that New England could make advantageous use of the excess power from the proposed power development. A New England rail executive, Mr. J. J. Pelly of the New York, New Haven, & Hartford Railroad, states that "the St. Lawrence

1. New England and the Seaway Treaty. Bulletin #52 of the Great Lakes-St. Lawrence Tidewater Association, page 11.

waterway will have no serious effect upon the revenues of New England railroads." ¹ The Joint New England Committee states:

"Throughout the four-month period when the waterway will be closed by ice the railroads are most in need of additional traffic in order to level out the fluctuation in demand, and the surplus railroad capacity which is available during this period is considerably more than enough to accommodate any possible increased demand which the diverted water traffic could possibly impose at that season." ²

Mr. Harriman further states that the seaway will mean that Eastern prices paid for Mid-Western goods will be more reasonable. This, it might be added, will be effected without the present hardship inflicted on the farmer. Eastern industries will be able to obtain raw materials cheaper and sell finished goods in the Middle West at lower prices. Also, the Northeastern seaboard ports can reasonably expect to act as storage centers for Mid-Western grain and produce awaiting shipment to Europe. This export grain and produce will be held at lower prices than could exist in other Atlantic seaboard ports, and railroad freight differentials, now acting adversely to New England ports, and favorably to New York and ports south, would be overcome. Thus Mr. Harriman brings out another important advantage of the Seaway to New England. ³

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1. New England and the Seaway Treaty. Bulletin #52 of the Great Lakes-St. Lawrence Tidewater Association, page 25.
 2. Ibid, page 25.
 3. New England and the St. Lawrence Waterway, page 33.

From a purely economic standpoint, cheap transportation is desirable, and, if the proposed Seaway offers cheaper transportation, we, as a nation, would improve our economic equipment by availing ourselves of the lowered rates it would make possible.

There seems little doubt that lower prices and a wider prosperity for New England would result. Because of the great number of horses and wagons we p^ossessed when the automobile was first placed on the market, did we relegate the new invention to oblivion for the reason that it would interfere with the status quo and the then existing method of local transportation? An operation which quickens the efficiency of a hand or a foot is quite likely to react to the general good of the whole body. For the hand to be jealous of the foot, or vice versa, is utterly ridiculous and a negation of enlightened self-interest.

3. The final principal source of New England opposition to the treaty is the Port of Portland. Henry F. Merrill, its president, expresses the belief that the proposed navigation development will mean economic disaster to Portland as a port and threaten the prosperity of the city. He terms the entire project "unsound, impractical, and nonsensical," due to the limitation of navigation on the Seaway to only seven months¹ of the year.

The Great Lakes-St. Lawrence Tidewater Association answers Mr. Merrill, stating that official records show that the Seaway will be open to traffic for eight months on the Great

1. New England and the Seaway Treaty. Bulletin #52, Great Lakes-St. Lawrence Tidewater Association, page 25.

Lakes and for seven and one-half months on the upper stretches of the river.¹ They go on to say that Montreal's status as a great world port today refutes the statement that because the river above Montreal will be closed to traffic for some months the project is not feasible. When Mr. Merrill says that a new type of ship will be required, the Association replies with the finding of engineers that nearly 90% of present shipping can utilize the new Seaway.²

Perhaps as good a summary of the refutation to New England opposition as can be found is the report of Herbert C. Hoover, former chairman of the United States-St. Lawrence Commission, who wrote:

"There has been some feeling that the construction of the St. Lawrence waterway will injure the interest of our Eastern states by decreasing terminal business of lake and seaboard cities; will divert traffic from American railways; and endanger our commercial and financial control of American exports and imports over this route. Of first importance is the fact that the total estimated tonnage available today for the waterway amounts to under 4% of the present tonnage carried by the American railway systems which now connect the Lakes with the seaboard. It comprises less than 12% of the sea shipments now moving through the affected American seaports. The natural increase in traffic

1. New England and the Seaway Treaty. Bulletin #52, Great Lakes-St. Lawrence Tidewater Association, page 28.
 2. Ibid, page 30.

and in population would quickly recover such amounts theoretically before the earliest possible completion of the waterway. . . . It is certain that American cities, of which New York is the center point, would remain the financial and commercial centers of America's foreign trade regardless of the route of traffic. . . . In the wider view, the increased prosperity of the mid-continent, the relief of many of their present economic difficulties, and development of huge water power for stimulation of industry and commerce in New York and New England shall add to the prosperity of the country as a whole and thereby benefit every citizen and every city.¹"

The Railroads were represented before the Senate Committee by the Association of Railroad Executives, Security Owners Association, Railway Labor Executives' Association, and American Short Line Railroad Association. Their argument against ratification was voiced by Alfred P. Thom, general counsel of the Association of Railway Executives.² Mr. Thom feared the competition of the Seaway, and said: "I do not know of any [existing waterway] that is economically justified." Continuing, he asserted that the actual costs of the Seaway will be greater than the estimates, that these costs for a subsidized service will be borne by the taxpayers, that there is no present or prospective need for the project, and finally that

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1. Extract from Senate Document No. 183, 69th Congress, 2nd session, page 7.
 2. Great Lakes-St. Lawrence Treaty --Bulletin #53, page 20. Great Lakes-St. Lawrence Tidewater Association, 1933.

"it will involve the use of public revenues . . . for the benefit of some of the people only."¹

In reply we may say that even a cursory comparison of rates should make it apparent to Mr. Thom that ocean and water transport is substantially lower in cost than land transport; then, too, the "estimated costs" referred to by Mr. Thom are based on 1926 prices, which were invariably higher than the present level of prices. In many instances today railroads demand rates that exact every penny the traffic will bear, and oftentimes the rates exceed the point-of-production price of the article produced or fabricated. The Seaway is not the project of and for "some of the people only," for it is of direct benefit to 40 millions of people on whom the prosperity of the rest of us depends. Furthermore, without doubt the railroads will feed the Seaway traffic at the ports of the system. There seems little question but that through this function^{they} will become an integral part of the Seaway system.

The various port transfer interests now centering at Buffalo, and the Lake Carriers Association opposed the treaty before the Senate Committee because it would interfere with their vested interests and their control of the existing restricted water channels which lead out of the Great Lakes towards the ocean. The essence of their argument was that the present route is perfectly good and safe when used by small vessels and the "canalers" ^{which} ~~with~~ they own, but that the projected Seaway would be unsafe and uneconomical when used

1. Great Lakes-St. Lawrence Treaty. Bulletin #53, page 20.
Great Lakes-St. Lawrence Tidewater Association.

by larger vessels operating in more spacious waters. This¹ objection does not merit an^{extended} answer for its unfairness is patent. It is equivalent to asserting that ocean traffic is unsafe.

James E. Davidson, Great Lakes shipbuilder, owner, operator, and official of ten Great Lakes Steamship companies says:

"I have been identified with this movement toward completing a deep waterway from the interior of this continent to the sea ever since the movement started, as a boat operator, a citizen, and as an official of the State and of the United States Government. I have listened intently to every argument that has ever been offered pro or con, and I can truthfully say that I am just as much an ardent advocate of the completion of the St. Lawrence project today, and more so, than I was before I heard all of the arguments. I can honestly say as a boat operator that the project is so thoroughly feasible and that it is conducive to the extension of a cheaper transportation cost to a landlocked interior, and I can say as a patriotic American citizen that the project ought to be completed at the earliest possible² moment."

Mr. Davidson was a pioneer in the movement for the Seaway and was a member of the Great Lakes-St. Lawrence Commission.

Mr. George W. Stephens, in his book "The St. Lawrence Waterway Project," tells us that in Canada the Lakes area has a population of four and three-quarters millions, that the

1. Great Lakes-St. Lawrence Treaty. Bulletin #53, page 15.

Great Lakes-St. Lawrence Tidewater Association, 1933.

2. Ibid, page 16.

land is rich with timber and minerals, and that Canada needs the Seaway to facilitate the transportation of these raw materials and the finished products made from them.¹ The Presidents of the Canadian Pacific and Canadian National Railways publicly and fearlessly stated that the Seaway would mean expansion of Canadian agriculture, development of manufacturing and industry, and would increase the internal commerce and the growth of foreign commerce.²

The Seaway really is not an inland waterway; it actually is a searoad to the vast Middle-West. In an inland waterway system it is necessary for an ocean carrier to take the place of the inland waterway carrier when the seaport is reached, but in the instance of the St. Lawrence ocean the ships themselves will go in and out to the desired ports and no interchange will be needed. It will mean the projection of ocean shipping to the midcontinent. There will be forty miles of canals over the entire system, with sixteen locks, but this is only 3% of the entire route's distance. The delay resultant from these canals will only be the equivalent of adding 144 miles to the journey.³ This slight delay will not make the project less feasible.

On February 10, 1933, the sub-committee of the Committee on Foreign Relations of the United States Senate, headed

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1. "The St. Lawrence Waterway Project." By George W. Stephens. Carrier & Co.: Montreal.
 2. Great Lakes-St. Lawrence Treaty, Bulletin #53, page 27. Great Lakes-St. Lawrence Tidewater Association, 1933.
 3. Bulletin #51. Seaway and Treaty. C.J. MacManus. Page 4.

by Senator William E. Borah, voted five to two in favor of ratification of the pending treaty. One of the negative votes was cast by Senator Robert F. Wagner of New York, who declared that he voted "no" because he ~~was~~ not completely sure of his "ultimate stand" on the entire project. He definitely favored the "advantageous power features," but found some of the navigation features "objectionable."¹ The Senate Foreign Relations Committee, on February 22, approved the treaty by a vote of 15 to 5.² Proponents of the project hope that definite action by the Senate will be taken during the special session of Congress this spring.

On February 15, 1933, two more seeming objections were raised to the pending treaty and the matter was again "news." The National Transportation Committee, headed by Calvin Coolidge until the time of his death, which was organized at the suggestion of holders of railroad securities for the purpose of studying indebtedness, competition, and general situation of the roads, reported. The report stated that any waterway or seaway should bear all costs of amortization, interest, maintenance, and operation, and added that "if they cannot bear such charges and compete with other forms of transportation they should be abandoned."³ The second and final objection raised the question of practicability, and was followed

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1. New York Times, 2/11/33.
 2. Boston Herald, 2/23/33, AP dispatch.
 3. New York Times, 2/19/33, page 4E2.

by the statement that "if the Seaway should be shown to be the march of progress, and if cheaper and more efficient transportation can thus be achieved, no barrier should be imposed against such a development."¹

Mr. Harriman and others have conclusively shown, it seems to me, that the Seaway will mean great savings in transportation costs to the economically maladjusted Mid-Western producers, with resulting benefits to other sections of the country. If, at first glance, the water route seems slower than the rail route, we must recall that freight hauled by rail is often held up for long periods in transit. As stated previously, the delay in freight transported via the Seaway will be only the equivalent of adding 144 miles to the journey.

There may be conflict on the issue of whether the St. Lawrence Seaway means progress. The same issue was raised when the Panama Canal project was under consideration. The St. Lawrence means to the North-Central sections of our country what the Panama Canal meant to the seaboard. Let not our concept of progress be colored by sectionalism or petty selfishness.

We must^t further take issue with the National Transportation Committee when the question the practicability of the project. The practicability is an engineering problem, and every engineering study made by the Federal Government, the State of New York, and the Province of Ontario has definitely and positively stated that the entire project is practicable and feasible from the engineering viewpoint.

1. New York Times, 2/15/33, Report of Nat'l Transportation Com.

On the question of the necessity of the self-sufficiency of the project alluded to by the Committee, it may rightly be asked how many railroads today in the entire country are self-sufficient, even considering their abnormally high freight rates? How many railroads in the country have not been subsidized, refinanced, or helped by the Reconstruction Finance Corporation? Does the Committee give adequate consideration to the fact that thousands of idle men will be put to work on the projected development for the next six or seven years, that it is more than a question of staving off bankruptcy of a few financially weak railroads by means of loan after loan of the taxpayers' money, much of which can never be repaid? Should not the Committee take into consideration the fact that the navigation and power project will not only be a boon to industry and consumers of power in New York State, but also will undoubtedly go far to assist in the solution of the pressing Middle Western problems, including that seemingly insurmountable difficulty, the farm problem? From a wide national economic viewpoint, despite local opposition, the entire project promises a larger and fuller economic prosperity; it will, in effect, join the Great Lakes to the Atlantic seaboard and make them a part of the seaboard; and, finally, it will mean closer and more friendly commercial relations between the United States and Canada.

In Canada there has not been quite so much opposition to ratification by Parliament, and the principal objection has

come from the city of Montreal. Why? Because Montreal today is as far as ocean-going traffic can penetrate into Canada from the east. It is more than obvious that this opposition is also based on selfishness and a desire to have all the good things at the expense of the rest of the Dominion. Similar to opposition in the United States, it is the usual and expected argument of special privilege, and existing all-but-complete monopoly.

Among all the opponents there was not one representative of a manufacturers' association, agriculture, lumbering, mining or ¹Midwestern home owners. For the treaty stand the American producer and consumer; against it are arrayed existing and localized transportation, storage, and transfer interests.

1. Hearings Before Sub-committee of Committee on Foreign Relations, United States Senate, 72nd Congress, Second Session on Senate Resolve 278.

CHAPTER VIII

THE MARKETING OF ST. LAWRENCE POWER

Under the St. Lawrence treaty, the share of this country in the power to be developed in the International Rapids Section is about 1,100,000 horsepower. As has been stated, in the low-water season, there will be about 4,800,000,000 kilowatt-hours to be distributed, and for the remainder of the year there will be approximately 6,300,000,000¹ kilowatt-hours to be utilized. The low-water season occurs in the months of January and February, and the mentioned number of kilowatt-hours is based on the amount of 720,000 firm² horsepower, New York's share, being used all the time.

The New York State Advisory Board of Engineers estimated that the aggregate load factor of domestic consumers is less than 30%, of factories less than 50%, and of electro-metallurgical and electro-chemical industries about 90%. The Board further stated that the ordinary load factor of a large, efficient hydro-electric plant with diversified load will run to about 85%³ annually. Basing their opinion on what happened in the case of the Niagara power development, the New York Engineering Board predicts that many new industries will locate at or near the plant site.⁴ This has usually been the

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1. First Annual Report of the New York State Power Authority, 1931, page 5.
 2. Ibid, page 5.
 3. Report of the St. Lawrence Power Development Commission, 1931, page 57.
 4. Ibid, page 58.

case, for the obvious reason that at or near the site of the power plant, rates are at a minimum.

The New York Power Authority, discussing domestic rates and the potential market for St. Lawrence power in its Second Annual Report published this year, said: "The law, in prescribing the lowest feasible rates for domestic and rural use, virtually directs the Power Authority to dispose of a great supply of power in such a way as to secure for the homes and farms of the State effectively promotional rate schedules. Today the average home consumption in the State is not more than 600 kilowatt-hours a year. This means that domestic consumers in the State are using electricity for little more than lighting and the smaller appliances. It means that rate schedules generally in New York State are not actually promotional.

"This generalization is substantiated and amplified in 'A Study of Rate Schedules in New York State,' prepared for the Power Authority by Otto M. Rau, consulting electrical engineer. His study is based upon data supplied by electrical utilities throughout the State.

"In an effort to find some indication of the levels at which rate schedules become genuinely promotional, Mr. Rau sets up two tables which are shown below.

"Table 1 contains data from companies serving representative areas from which reasonably accurate figures were available and in which the average kilowatt-hour rates range upwards from five cents.

TABLE I

Certain Areas in Which Domestic Rates Average from 5¢ Up

Company	Number of Domestic Consumers	Av. Use per Consumer	Av. Cost per Kwh.
Rockland Light & Power	24,472	492 kwh.	9.64¢
Queensborough Gas & Electric	28,400	533 kwh.	8.11
Long Island Lighting	111,556	543 kwh.	7.90
Central Hudson Gas & Electric	47,535	470 kwh.	7.35
Utica Gas & Electric	32,206	431 kwh.	6.87
Rochester Gas & Electric	100,426	543 kwh.	6.51
Syracuse Lighting	65,650	503 kwh.	5.44

" Table 2 contains data from companies maintaining a much lower average kilowatt-hour rate for domestic consumption.

TABLE II

Areas of Low Rates and Higher Consumption

Company	Number of Domestic Consumers	Av. Use per Consumer	Av. Cost per Kwh.
Niagara Electric Service	17,984	1,644 kwh.	2.13¢
Niagara Falls Gas & Electric	101	1,661 kwh.	2.74
Buffalo General Electric	146,256	814 kwh.	3.38
Tonawanda Power	7,614	743 kwh.	4.00

" The figures are for the year 1930.

" The uniformity of average domestic use of electric service shown in Table 1, notwithstanding a variation in the average cost per kilowatt-hour from five to nine cents, suggests that an average rate of five cents or more is a barrier to the increase of the average home use above the present-day standard.

"On the other hand, Table 2 indicates that with an average rate of three cents or less per kilowatt-hour, a higher standard of electrification for domestic service, and a consequently greater consumption of electricity, will be encouraged. This

table may be supplemented by figures from the Seattle municipally owned system showing for 1931 an average domestic consumption of 1,098 kilowatt-hours at an average rate of 2.8 cents per kilowatt-hour; or from the Tacoma municipal plant with an average domestic consumption of 1,550 kilowatt-hours per year at an average rate of 1.73.

"These figures suggest that truly promotional rate schedules might encourage homes and farms throughout the State to double their use of electricity.

"In urban homes the greater part of the increased demand would come from electric heating devices, such as ranges and water heaters, although there is still room for a wide expansion in electric refrigeration. Farms offer an additional opportunity for materially increasing the average domestic consumption of electricity by its use for such purposes as pumping water supply, operating cream separators, and perhaps milking machines, lighting chicken houses, operating incubators, and feed grinding.

"Such new uses would create a demand at other ^rperiods of the day than during the peak of the lighting load and so would tend to improve the load factor of the operating companies. This is especially true of heating devices, which can be regulated so as to operate at times when demand for current is otherwise low. As a result the cost of providing additional service would be in no way comparable with the increased use afforded.

^h The replies to questionnaires showed that in 1930 there were 3,187,978 domestic consumers of electricity in the state, who used 1,912,562,838 kilowatt-hours, giving the average of 600 kilowatt-hours per customer per year. An increase in the average home use to 1,200 kilowatt-hours a year, assumed above, would mean a market for an additional 1,900,000,000 kilowatt-hours, equivalent to approximately one-third of the potential output of the St. Lawrence project.

"The classes of consumption that may be affected most directly by the lower rates which St. Lawrence power should make possible, include not only domestic, but also commercial, street lighting and other municipal services. In 1930 these classes of consumers in New York State used about 3,300,000,000 kilowatt-hours of electricity. As there is very considerable room for expansion in each class, once rates are such as to encourage it, there is every reason to feel assured that St. Lawrence power, disposed of in accordance with the purpose of the law, will create its own market.

"The expectation that low rates will automatically create a market for St. Lawrence power in the homes of the State is supported by the statistics of average domestic consumption in cities served by the publicly-owned Ontario Hydro-Electric System. In 1931 residential use of current in 25 of these cities, which have a population of 10,000 or more, averaged approximately 1,500 kilowatt-hours per year.

"The average annual domestic consumption in several of these cities may be noted, as follows:

CITY	AVERAGE DOMESTIC CONSUMPTION
Toronto	1,608 Kwh.
Windsor	2,160 Kwh.
London	2,040 Kwh.
Hamilton	1,764 Kwh.
Niagara Falls	2,712 Kwh.

"The extent to which the electrical industry itself is expecting extraordinary increases in the domestic use of electricity is reflected in the annual issue of the Electrical World published to coincide with the National Electric Light Association convention. The May 28, 1928, issue of this publication contains an article on the possibilities of the electrical market, which assumes an available business in the field of domestic consumption averaging 3,000 kilowatt-hours per year per home.

"If the average use of electricity in the homes of New York State should approach this figure the domestic market alone would absorb as much as 7,000,000,000 additional kilowatt-hours of electrical energy, or more than the entire potential output of New York's proposed power houses on the St. Lawrence.

"That this is not an unwarranted expectation is shown by the fact that the homes in Winnipeg have an average use in excess of 4,000 kilowatt-hours a year.¹ Also it was brought out in^a quotation from Henry I. Harriman in Chapter V that New England might even purchase one-quarter million horsepower as a base load for her energy requirements, as the high cost of coal here, due to the distance from the mines, renders steam power expensive.

1. Second Annual Report of the Power Authority of the State of New York, 1932, pages 35-38.

Many interesting studies have been and are now being made by New York State, not only on the question of distribution and the attraction of new industries to the site, but also on the problem of rural electrification of the Empire State.¹ In 1932 studies and estimates were made by the New York Power Authority on transmission costs which indicate that power can economically be sent to the New York City Metropolitan area. The Power Authority stated: "In approaching the problem of negotiating contracts for the disposition of so large a block of power on a basis which would carry out the intent of the law, the Power Authority has recognized that a considerable proportion of the energy would have to flow to load centers at various distances from the power plants. As a result the Trustees have been forced to consider transmission costs. The specific questions asked the engineering consultants were:

"(1) To what areas can St. Lawrence power be economically transmitted?

"(2) What will be the cost of the power after transmission to the various substations from which it would be distributed to these areas?

"The engineers advise that modern experiment has been steadily extending the distances of economic transmission of power and that 300 miles represents a conservative estimate of the present radius of the zone within which St. Lawrence power can be economically delivered if developed at the cost indicated above.

1. First Annual Report of the Power Authority of the State of New York, 1931, page 26.

"The major trunk transmission lines in the State of New York today run east from Niagara. Although the network of existing transmission lines owned by the public utility companies is extensive, including lines running north from the central transmission system to the area of the proposed St. Lawrence development, full utilization of St. Lawrence power in the State would undoubtedly require either an enlargement of the capacity of existing lines or the building of a new north and south transmission line of large capacity extending from the river to southern New York.

"Discussion of the cost of St. Lawrence current transmitted to the more remote parts of the State, we believe, has frequently erred in assuming that the entire block of power would be so transmitted, carrying the full cost of the required transmission lines. Actually St. Lawrence power, after deducting the block to be used in the region adjacent to the river, will be put on the trunk transmission line to be taken off in blocks at substations located at various distances from the power plants to serve the different regions traversed. Thus any power that may be ultimately transmitted to New York City will have to carry only a part of the cost of that section of the transmission line which is also used to deliver power to substations serving areas nearer the river.

"It should also be borne in mind that the most economical use of St. Lawrence power will ultimately be in conjunction with local steam plants in the regions served, and that presumably, due to variation in the times of peak loads, current on

the transmission lines will not always flow in the same direction. A transmission system is, in reality, a power pool, fed from various sources of power. From this pool different areas draw as they need power.

"In order to determine the economic availability of St. Lawrence power and its potential value in assisting the transition to lower promotional rates, the Power Authority, while recognizing that the advance of the art may at the time of construction indicate the advisability of a higher voltage, asked its engineering advisers to prepare estimates based on a 220,000 volt transmission line from the St. Lawrence River to the metropolitan area, with substations at points necessary to meet the probable demand of the various parts of the State traversed. In order to get a consensus of engineering judgment on this important problem, engineers were chosen representing widely varying experience in the actual construction and operation of high tension lines in different sections of the country.

"As yet we are not prepared to present our final conclusions as to transmission costs. The subject is extremely complex and will require further study in order to correct all possible sources of error. Nevertheless, we think it will be of interest to present at the present time certain tentative conclusions from a study by Major Clayton W. Pike, who had previously considered the data contained in preceding studies.

"These conclusions are sufficient to convince us that St. Lawrence power can be economically transmitted to the metropolitan area of New York with a resulting saving over the alter-

native costs of steam generation. We are not yet ready, however, to estimate what this margin of saving will be and we therefore defer our final conclusions for a later report.

"This study is based on recent experience in connection with a transmission line having characteristics similar to those required for the transmission of St. Lawrence power, and traversing a like region in this part of the country. It makes the following broad assumptions:

"(1) That a trunk transmission system for utilizing St. Lawrence power should consist of six circuits covering the 135 miles from the power plants to a substation in the Mohawk Valley from which power can be distributed east and west; and of three circuits extending thence a distance of about 175 miles to a substation near New York City from which the metropolitan area could be supplied. In the calculations two rights of way and the very highest class of construction at 1929 costs were assumed throughout, the lines being located so as to assure the maximum dependability.

"(2) That at least a quarter of the power would eventually be used in the region near the plant; that the balance would be transmitted as far as the Mohawk Valley substation, with half of it distributed there and the remainder carried on to southern New York.

"On the above basis and assuming a 50 per cent. load factor, it was estimated that power could be delivered at the terminal substation in southern New York at not more than 5 mills. This cost includes generation, transformation and transmission with allowance for losses in transmission. If the transmission line

and terminal substations could be built at present prices the cost would be considerably less.

"While a 50 per cent. load factor has been assumed in the above calculations actually the most economical use of such a block of power would be as base load power in conjunction with existing steam plants. This combination would make it possible to use St. Lawrence power in the New York City area at a load factor much higher than 50 per cent. and possibly at some periods approaching 100 per cent. As the total costs of transmitted St. Lawrence power are practically constant, irrespective of load factor, the average cost per kilowatt-hour delivered would be proportionally reduced, with the lower limit approaching 2.5 mills.¹"

The Power Authority taking up the question of the need for Rural Electrification stated: "The Power Authority has taken account of the mandate of the Legislature that St. Lawrence power be utilized in part in such a way as to permit . . . rural use of electricity. In order to be prepared to follow this direction, the Trustees have undertaken a detailed study of the whole problem of rural electrification.

"For a number of years the problem of extending the farm use of electricity has been engaging the cooperation of the Public Service Commission, the State College of Agriculture, and the utilities, and much credit should be given for the resulting progress which has been made under what is known as the Adirondack Extension Plan, which was originally filed with

1. Second Annual Report of the Power Authority of the State of New York, 1932, pages 39-42.

the Public Service Commission by the Adirondack Power & Light Corporation in 1924.

"The plan applies particularly to the computation of the minimum monthly bill which each farmer must agree to pay in order to obtain electric service. This minimum bill is fixed on the basis of the average length of the line extension per customer in such a manner that each rural extension shall provide from the very beginning sufficient revenue to cover fixed charges on the investment plus whatever may be chargeable to the costs of generating the current and doing business. Actually the minimum bills must produce \$24 a month per mile of rural extensions. If there are four customers to a mile the average minimum monthly bill amounts to \$6.

"The advantage of this plan over those of earlier origin is that it eliminates the requirement that the farmers provide some or all of the capital required for their extensions, and that it makes possible the application of substantially the same rate schedules to urban and rural customers in a given area. In other words, except for the effect of his minimum bill, the farmer shares in such approaches as the utilities make to a promotional set-up for urban rates.

"In spite of the very considerable progress since the plan was adopted, the rate of increase in farm electrification in New York State has not kept pace with that in the

country as a whole. Although this can be explained by the fact that the percentage of farm electrification in the State is much higher than the average for the Central West and the South, it is more difficult to account for a lag in the rate of increase as compared with New England, in which the general level of farm electrification appears higher than that in New York.

"In 1931 approximately two-thirds of the farm dwellings in New York State were without electric light, while only 10 per cent. of the farms in the State were reported as using electric motors for farm work. Nine other states report a higher percentage of farms employing electricity for this purpose.

"Such figures indicate that the real possibilities of farm electrification in New York State are still to be realized. This applies not only to the farm as a home but with even greater weight to the farm as a business establishment which should find in electric power the efficiency and economy that it has brought to other industries.

New York farms today use a total of perhaps 50,000,000 kilowatt-hours where they might readily afford a market for 350,000,000 kilowatt-hours of electrical energy.

"It is unnecessary in this report to detail the uses of electricity in the farm home, for in this matter the farm household differs very little from that of the city dweller. It should, however, be noted that electrical appliances may contribute more to the operation of the farm

home both because more work is performed in it and because it enjoys fewer alternative services."¹

An excellent summary of the effect of St. Lawrence power on industrial development in the future and the urgent need for this vast amount of cheap power is given by the Power Authority. It follows:

"It has been suggested above that that, after the development of the consumption of electricity in the homes and on the farms, the second major benefit from New York's power project will come through the industrial development which will take advantage of the availability of cheap power in the region adjacent to the project.

"Pursuant to the directions contained in the law the Power Authority has had a careful preliminary survey prepared covering the probable industrial potentialities of the region. This theoretical survey is now being followed up by a practical canvass to establish the basis for a planned development.

"It is impossible in this report to go into the details of this investigation. We may, however, call attention to a few facts which indicate the growth of industry which may be expected to follow the utilization of the vast energy resources in the International Rapids Section of the St. Lawrence River.

"Because of the basic importance of power in our civilization there is a direct relationship between the amount of power developed and the growth of industry, measured by invested capital, wages paid, number of workers employed and,

1. Second Annual Report of The Power Authority of the State of New York, 1932, pages 44, 45.

more broadly speaking, industrial wealth.

"A number of studies have been made to establish an approximation to this relationship. One of these, sponsored by the Pacific Coast Division of the National Electric Light Association, related the growth of installed horsepower to the economic development of eleven Western states. A similar survey of seven Northeastern states, covering the first quarter of the century, affords another basis for estimating the effect of hydro-electric power development upon the growth of industries. Still another study, showing the relation between industrial development and installed primary horsepower in Ontario and Quebec, was included in the very able report on the economic aspects of the St. Lawrence project by Mr. Lesslie Thomson, consulting engineer of Montreal, Canada.

"The Power Authority has supplemented these previous investigations with a corresponding analysis of the region affected by Niagara power, and on the combined results estimates that the installation of 1,100,000 horsepower on the United States side of the St. Lawrence River will mean over a period of thirty years:

\$550,000,000	additional capital invested in manufacture
\$90,000,000	additional wages and salaries per year
\$220,000,000	additional annual factory output
80,000	additional factory workers

"Taking into account only the families dependent on these additional factory workers this will mean support for an added population of perhaps 300,000. All of this means employment in factory construction and home building, additional whole-

sale and retail business, additional demand for the products of other sections of the country, and in general, additional wealth to help bear the burden of taxation.

"The growth of two cities in Canada affords interesting evidence of the effect of power development. Shawinigan Falls, where 203,500 horsepower of hydro-generating equipment was installed, experienced a population growth from 4,265 in 1921 to 15,345 in 1931, an increase of more than 250 per cent. Three Rivers, in conjunction with the La Gabelle hydro-electric development, experienced a population growth from 13,980 in 1921 to 35,450 in 1931, an increase of about 150 per cent.

"These facts were urged before the Senate Committee as of great importance not only to New York State but to the nation as a whole. If the development of New York's immense resource of cheap power on the St. Lawrence is not immediately undertaken, the people of New York may sit helplessly by while industrial development, which might otherwise take place on this side of the border, moves to Canada where great quantities of cheap power are available.

"Each year that the St. Lawrence development is delayed means a large economic loss not only to the region contiguous to the river but also to the State as a whole and indirectly to the entire country."¹

It has been recommended that New York State's share of the power be distributed in part by permitting municipi-

1. Second Annual Report of The Power Authority of the State of New York, 1932, pages 47, 48, 49.

palties to sell direct to the small consumer and to form power districts for this purpose. It has also been suggested that the municipal plants be allowed to serve customers beyond the corporate limits in order to facilitate rural development and cheap rates. This suggested legislation would, of course, be permissive and not mandatory.

The remaining power would be distributed through existing utilities, but a complete public distribution system might be inaugurated if there should be complaints as to rates, charges, or service. With this possibility in mind, existing utilities will doubtless be influenced to give greater consideration to all classes of consumers.

CHAPTER IX

THE OPENING OF NEW MARKETS

The mid-section of the North American continent today is land-locked. Through the ages peoples have used every means in their power, including the shedding of the blood of their fellow men, to gain access to the sea. The present agitation in Canada and in the United States for the Seaway is but a contemporary manifestation of this struggle to reach the sea-coast. In the United States twenty-three states have joined their efforts in an attempt to make the Seaway an accomplished fact. The following states^{have} associated themselves into a voluntary association, ~~and~~, under the name of the Great Lakes-St. Lawrence Tidewater Association,^{to} assemble and disseminate helpful information in regard to the improvement of the St. Lawrence so that the Great Lakes may be connected with the Atlantic Ocean:

California
Colorado
Idaho
Illinois
Indiana
Iowa
Kansas
Kentucky
Michigan
Minnesota
Missouri

Montana
Nebraska
North Dakota
Utah
Washington
West Virginia
Wisconsin
Wyoming
Ohio
Oregon
South Carolina
South Dakota

It is a fundamental fact that water does not divide a people or a continent, but fuses^s and unites them commercially because of the generally lower cost of water transportation. The Seaway is thought by many to be a completely new route

to the sea, while in reality it is only planned to deepen and make more efficient an important but inadequate existing system. It is the intention to nearly double the present depth¹ of the existing canal system and so modernize the system that the immediate and future needs of the continent will be satisfied.

Ralph Thompson tersely summed up the aim of the Seaway when he said: "If the treaty is ratified, and the plans it contains are carried out, it will be possible for most sea-going vessels--90 percent. according to President Hoover--to enter the Great Lakes through the St. Lawrence River and to load and unload cargoes at such great ports of the Middle-West as Duluth, Chicago, and Port Arthur without the expense and delay of transshipment to and from lake vessels and railroad cars."¹

It should be pointed out that the proposed Seaway belongs to the group of approaches to our ocean ports such as the Delaware River to Philadelphia, the Hudson River to Albany, and the Mississippi River to New Orleans. The only difference rests in the fact that in the instance of the St. Lawrence project ocean vessels will travel in some cases 1400 miles along the proposed approach before reaching port. This plan of extending the coastline of the continent will lengthen the coastline about 25 percent.²

The canal system, before the opening of the New Welland Canal, and with a depth of but 14 feet, carried over

1. Current History, September 1932, page 693

2. Bulletin # 51, page 2, Great Lakes-St. Lawrence Tidewater Association, 1932.

8,400,000 tons of freight in 1928.¹ Some concrete illustrations of the estimated savings in freight rates are given by Charles J. McManus in charge of Transportation and Research for the Great Lakes-St. Lawrence Tidewater Association. He says: " The Kohler Company of Wisconsin saves more than four dollars a ton on clay brought in directly from England. [today, under the system of 14-foot depth canals]. The Studebaker Corporation of Indiana, as a result of savings following two experimental shipments of boxed and unboxed autos overseas, points out that a freight reduction of twenty-five dollars a car is possible when larger when larger ships are able to engage in the through lakes-ocean trades. The Chicago Tribune, on the basis of savings made on all-water shipments of newsprint from Three Rivers, Quebec, estimates that the Seaway might mean a saving as high as three dollars a ton on its paper requirements."

Mr. McManus continues: " The primary and widest-spread benefit of the improved Great-Lakes Seaway is that, for all purposes of commerce, the Great Lakes become an estuary of the Atlantic. Their shoreline at once becomes a seacoast, between the ports of which and the ports of the world, ocean carriage--the world's lowest cost transportation--will apply.

"Distance to market is measured by the yardstick of freight rates. By this standard the Seaway remakes the transportation map of the world. It adds value to the products of industry

1. Bulletin # 51, page 7, published by The Great Lakes*St. Lawrence Tidewater Association, 1932.

and agriculture, and it will reveal and develop new markets, new industries, and new business with all that implies in national efficiency and increased purchasing power of the forty million people living in the area tributary to the Great Lakes.

"As a counterpart of the Panama, the Seaway means broader commercial relations between markets on the Pacific and those adjacent to the Great Lakes. Likewise the Gulf-Atlantic-New England coastal rim and the lakes region are brought into closer business contact. It is of distinct benefit to our coastal and inter-coastal steamship services.

"To the railroads of the great west, the St. Lawrence is the rolling back of the ocean into the interior, bringing to their eastern termini 88 per cent. of the world's cargo ships. It confers upon the western lines the same privilege of direct access to the Atlantic that the eastern roads now enjoy--a privilege enjoyed only because of the improvement of approach channels by the Federal government at a cost of many hundreds of millions.

"The Great Lakes Seaway is not a rival to any inland waterway, constructed or proposed. Inland waterways and all other forms of inland transport are complementary to the ocean and¹ hence complementary to the Seaway."

High transportation rates from the Mid-West to the seacoast and from the seacoast to the Mid-West today mean that these ~~Mid-Western~~ farmers, producers, and manufacturers

1. Bulletin #51, Nov., 1932. Great Lakes-St. Lawrence Tidewater Association.

cannot sell and buy economic goods at reasonable prices because of high transportation rates which raise the prices of goods they purchase and sell.

Mr. Harriman, discussing freight rates, said: "The present agitation for the construction of an adequate channel through or around the rapids of the St. Lawrence was started about ten years ago by the merchants and the farmers of our Middle West and the Canadian West who felt that their products were unduly hampered by excessive freight rates. They pointed out the beneficial effect upon freight rates of the opening of the Panama Canal between the Atlantic and the Pacific coasts and they asserted that similar benefits would accrue to the Middle West if the ocean freighter could penetrate to the head of the Great Lakes and compete with the railroads for the transportation of bulk cargo, particularly grain, which must be moved from the West for consumption either on the Atlantic coast or for export to Europe."¹ Mr. Harriman, continuing, emphatically stated: "Figures compiled by government officials show that for equal distances ocean freights are usually 1/8 to 1/14 the corresponding rail freights, this difference depending on the length of journey, the class of freight carried, and the degree of competition between various water lines."²

Thus it is apparent that the Seaway will open up new markets to the mid-continent that hitherto were inaccessible because of transportation costs, which fact has held the

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1. "New England and the St. Lawrence Seaway," Henry I. Harriman, 1929, page 11.
 2. Ibid, page 16.

Middle West in a poor position to compete with other producers. Also, the mid-continent will be opened as a market for products imported, which, if now obtainable at all, are high-priced because of these same high transportation rates. It must be remembered that, when the present depression passes, Mid-Western competition with foreign agricultural areas and foreign producers will be keen, and the Seaway will be a vital factor in increasing our export trade.

CHAPTER X

THE IMPERATIVE NEED FOR ACTION

The St. Lawrence Seaway with the attendant power development, then, is desirable, and, in the words of Mr. Herbert Hoover, is "imperative both for the relief and for the future development of a vast area in the interior of the continent." He goes further and recommends the power development in the Thousand Islands Section of the river, saying in conclusion, "The development of the power resources of the St. Lawrence should be undertaken by the appropriate agencies."¹

Governors of eleven States have issued statements in behalf of their peoples urging immediate ratification of the pending treaty for the salvation of the Mid-Western farmer and producer. Governor George F. Shafer of North Dakota forcefully argues for the project, and says:

"The advent of the St. Lawrence Seaway has been too long delayed. Ever since the completion of the Panama Canal, the interior development of America has been sadly out of balance. The Panama Canal made the Atlantic and Pacific Coasts of this continent close neighbors in commerce, and

1. Senate Document #185, 69th Congress, 2nd Session, (Extract) Page 7. Report of the United States St. Lawrence Commission.

by the same token it lengthened the distance in terms of relative transportation costs from the interior of this country to its ocean ports. . . . Thus industries were obliged to remove from interior points to locations on or near the seacoast. Thus there was placed upon agriculture in the great mid-continent section a disadvantage beyond its ability to carry and still compete profitably with the markets of the world. Thus there was created a condition of economic dislocation, sometimes called 'economic inequality,' between great sections of our country, a condition which lies at the base of much of the economic discontent for something existing in the Mid-Western and Northwestern regions of our country, a condition which calls out for correction in a voice that is heard throughout the land. Because ocean commerce has no competitor in economy of costs, it will, when brought to the interior of the continent by means of the St. Lawrence River and Great Lakes, do much to equalize transportation costs between

seashore and inland centers of trade and production."

Former-Governor Philip F. Barollette of Wisconsin, strongly favoring the project, says:

"The placing of the Middle West on a plane of relative equality in the cost of manufacture through enabling raw materials and other bulky commodities to be brought to her ports through a seaway has a real economic significance for those other sections of the country which might seem superficially to suffer from this competition. The Upper Mississippi Valley was long viewed as a great grain field. More recently its agriculture has become diversified by dairy farming. It has in the past developed manufacturing. Its timber resources are becoming exhausted. It needs badly further industrial development to supplement its agriculture and to take up the economic slack which comes from the declining lumber industry and changes in the nature of agricultural production.

We know from many unhappy examples, locally

1. Eleven Governors Demand Speed for the St. Lawrence, Bulletin #50, Great Lakes-St. Lawrence Tidewater Association, January, 1932, page 14.

and nationally, in this country, that the whole country suffers when any one section is in a depressed economic state.

. . . There will be for the two coasts certain differentials and advantages which the Middle-west will not possess; but surely a system of water connections through which in the 18th century the French Voyageur could penetrate the vast interior of the continent ought not be neglected by the inventive genius and organizing skill of present-day America."¹

When we consider the objections that have been raised in the past few months to the treaty, we realize that the opposition is not on wide economic grounds but is nearly entirely local and selfish, a desire on the part of a few individuals and organizations to prevent something that seems immediately to threaten their possessions and advantages. This has been almost uniformly true of all the objections in both the United States and Canada. The objectors are ports, railroads, or group defenders of the status quo. They do not ask rejection of the treaty because it will not really help the mid-continent and will not go far

1. Eleven Governors Demand Speed for the St. Lawrence, Bulletin #50, Great Lakes-St. Lawrence Tidewater Association, January 1932, page 3.

to place that section more nearly on economic parity with the seaboard and near-seaboard, but because they fear that their port, railroad, or group will lose a few dollars of revenue yearly. Their objections are contrary to the modern spirit of cooperation and growth of intersectional and international good-feeling.

With costs averaging now 20% less than in 1926, the year on which the estimates are based, when could there be a better time to commence this great and needed work from the cost viewpoint; with ^{the} present staggering number of unemployed and the urgent need for immediate work, could a better time be suggested to prepare for the future of our country and continent? We can thus do now needed work, and when the present trying days have passed we shall have cheap power and a new Seaway to show for these years of economic hardship.

In overcoming former depressions, we have in the past had some new industry, some new and undeveloped territory, or some unexploited natural resource to assist us to regain our prosperity. Today we lack these former stimuli, and as we come nearer the end of our present difficult times, where can we find, as a nation, a better project and undertaking on which to focus our hope and aspiration for the future, which will give us not only needed work now but assure us that in the more prosperous days to come we shall be on a better competitive basis with foreign producers, be able to give to many industries cheaper power, and furnish to the local domestic user lower rates on current consumed?

SUMMARYECONOMIC ASPECTS OF THE ST. LAWRENCE PROJECT
as They Affect the United States

By William J. McNulty

Both the power and navigation features of the proposed St. Lawrence project are of immediate interest because the Senate of the United State will soon consider whether or not to ratify the treaty signed by the United States and Canada on July 18, 1932.

Proponents of the project urge ratification of the treaty, under which approximately 90% of world shipping will be able to go through all of the Great Lakes from Montreal by means of a 27-foot channel to be constructed. In addition, in the International Rapids Section of the St. Lawrence River it will be necessary to build two dams with side canals as part of the navigation development. These dams will make possible, when completed, the generation of about 2,200,000 horsepower of electrical energy, and one-half of the power generated in this section will be the property of the State of New York. This will furnish the State of New York, and possibly neighboring states, with a vast amount of cheap hydro-electric energy for industrial, commercial, and domestic use, and will make possible lower rates to all consumers than those existing at present. Of purely Canadian

interest is the potential power possibilities of the St. Lawrence River between the International Boundary and Montreal. It is estimated that in this sector, wholly within Canada, there may be developed for Canadian consumers an additional 2,800,000 horsepower.

The navigation proposal will open up the mid-continent to ocean shipping and will assist in the solution of the pressing farm problem, as it will extend to the Mid-Western farmer and manufacturer the advantage of a freight rate which will be only one-third or one-half the present cost of rail transportation. The construction costs are to be divided equally between the participating nations, and under the treaty these two nations will forever share equally in this major ocean transportation highway.

The advocates of the proposal include President Franklin D. Roosevelt, former President Herbert C. Hoover, the Great-Lakes-St. Lawrence Tidewater Association, which consists of the representatives of 23 states; Henry I. Harriman, director of the Chamber of Commerce of the United States; and all the engineering boards appointed by the Federal and New York State authorities, as well as all Canadian engineering boards. Broadly speaking, the producers and consumers of both nations urge acceptance.

It seems that all opposition that has arisen to the project is either uninformed or local and selfish, not giving adequate consideration to the project from a broad national viewpoint. The testimony against the project mainly comes

from the transfer, storage, and existing transportation interests--those to whom the producer and consumer pay the freight.

With present low construction costs, with the present need for finding employment for the jobless, and with the urgent need of assisting the Mid-Western farmer and manufacturer, it seems an irresistible conclusion that our Senate should ratify the pending treaty, which has been approved by its Foreign Relations Committee, and that the work should proceed as soon as possible.

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